



MODULE

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Module 1: Performance Power ... The Nutrition Connection: Getting Started

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In this module you will learn the basics of sports nutrition.

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Introduction

Performance — a word you will hear throughout your military career. You are rated on your performance in training. You are rated on your job performance. You are rated on your performance on regular physical fitness tests.

One thing that affects how well you perform in military training is the quality and quantity of the food you eat.

This material will show you how important nutrition is to your performance, both physical and mental. Nutrition is so important that many athletes consider it a key part of their training and competition.

When you are in intense physical military training, you are working at the level of an athlete. Using principles of sports nutrition can help you improve your military performance.

KEY CONCEPT

There is a relationship between nutrition and health and physical and mental performance.

OBJECTIVES:

With this manual you can learn how to:

- ▲ List the similarities between athletic training and military training and performance.
- ▲ Identify the nutritional needs of the athlete and the military person performing high-intensity and endurance activities and identify why these needs differ from those of the average person.
- ▲ Explain the principle of energy balance.
- ▲ Explain what nutrition balance means.
- ▲ Identify the six major categories of nutrients and explain their impact on performance and health.

Are You Ready To Begin?

Self-assess your readiness to begin. Check the column that best describes your answer..

	Yes	No	Unsure
1. Do you perform demanding physical work or exercise 3 or more days per week?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Do you often perform prolonged physical activities day after day?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Do you want your workouts to be easier?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Do you want to improve your performance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Do you want to feel and look better?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Do you want more energy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you answered yes to most of these questions, then you need Performance Nutrition!

The Elements of Military Performance



PHYSICAL ... Your ability to endure and accomplish the physical requirements of military training and conditioning.

MENTAL ... Your ability to consistently and accurately concentrate on the required actions.

EMOTIONAL ... Your ability to maintain professional military composure under physical and mental stress.

What, when, and how much you eat can affect all of these elements. Substitute the word "athletic" for "military" in the above descriptions, and you can see how an athlete's requirements for top performance are the same as they are for you.

Military Training = Athletic Training

When you're running across a field in BDUs with a pack and a rifle, you might not be thinking of yourself as an athlete.

When you're hiking miles through the rain before dawn, you probably aren't comparing yourself to a marathon runner.

During a day of artillery practice, you're probably not thinking that you're working like a biathlete in training for the Olympics.

Athletic training and physical military training do have a lot in common, however.

You Work Hard

For one thing, physical and mental performance are critical to success in military training and athletics.

Like an athlete, you work hard physically for hours at a time. Sometimes you might even work harder than an athlete. An athlete might train for several hours a day. You might do it all day, day after day.

Endurance, Strength, Quickness

Moreover, you have to perform all types of physical activities. For things like forced marches and hikes you need the endurance of a marathon runner. These are aerobic activities. They are low or moderate intensity, but they last a long time. Aerobic activities need a lot of work from your heart and lungs.

For training like the obstacle course you also have to be able to perform the kind of short, high intensity moves a hurdler or pole vaulter makes. To carry and assemble equipment you need the same type of strength a wrestler or weightlifter uses. These are anaerobic activities.

In some training you may be involved in all of these kinds of activities at the same time.



B.T., Captain, USAR, Coach Military Pentathlon Team, Former Team Member

"If your goal is to experience peak performance, you have to do everything, including nutrition. If you're not doing the total training concept, you're in essence running against the wind. You'll never make peak performance. When you're eating potato chips and drinking cokes, you're running against the wind."

Eating for Performance Power

Athletes know that how they eat can give them an edge in training and competition. The way you eat can give you the edge in military performance.

Burning It Up: In Sports, In Military Training

Here's one way to see how military training stacks up against athletics.

Calories measure the amount of energy you burn. Because of some differences in body composition, men burn about 10 percent more calories than women of the same weight doing the same activity.

Compare the average energy — the number of calories — you burn in certain military training events with the energy an athlete burns in similar types of activities.

*Based on 150-lb person

MILITARY TRAINING	CALORIES /MINUTE	ATHLETIC ACTIVITY	CALORIES /MINUTE
Conditioning hike 3.5 mph, 30lb pack, full gear	7.6	Cycling, 9.4 mph	7.4
Confidence Course	7.2	Orienteering	9.4
Circuit run	9.6	Basketball	10.2
Infiltration course	10.6	Cross country skiing	10.6
Close combat	11.5	Judo	13.3
Company run 8min./mile	14.8	Cycling - racing	11.5
Scuba diving	16.4	Scuba diving	16.4
3 mile run 6.5 min./mile	17.1	Running-race, 6 min/mile	17.3

TAKE ANOTHER LOOK

Here's another way to compare how much energy you burn in military training to the energy an athlete uses in a day of training.

AVERAGE CALORIES BURNED IN A DAY

The range represents differences in weight.

TYPE OF TRAINING	CALORIES BURNED PER DAY	
	Women	Men
Competitive athlete in training	2000-4000	3000-6000
Military Basic Training	2000-3000	3000-4000
Marine OCS	2200-3200	3600-4800
Army Ranger School	n/a	3600-4800
Navy Seal training	n/a	4000-5000
Mountain training	n/a	4600-6000
Arctic field training, Infantry	n/a	3000-4000
SOF reconnaissance & surveillance mission to include in- and exfiltration	n/a	3000-3700

What Affects Performance?

NATURAL TALENT: What you're born with.

TRAINING & CONDITIONING : How often, how long and how intensely you practice the same activity.

MENTAL ATTITUDE: How well you concentrate and stay motivated.

NUTRITION: What you eat, how much you eat, when you eat.

Eating For Performance Can Make The Difference

Athletes are finding that the way they eat can make the difference between winning and losing. The impact of nutrition on athletic performance is so clear that sports nutrition has become a recognized field of nutrition study.

This is why many professional and collegiate athletic teams consult with sports nutritionists. A growing number of competitive athletes work individually with sports nutritionists and dietitians to develop personal performance diets.

The same principles of sports nutrition that are helping athletes perform better in training and competition can help you perform your best in military training and throughout your career.

Questions & Answers

HOW DO I EAT FOR PERFORMANCE?

To eat for top performance you first need the right amount of food, or **calories**.

Food is the fuel that gives you energy. You burn energy in everything you do — even sleeping. The more active you are, the more energy you burn.

You are probably burning more energy in training than you did when you were less active. For instance, in a typical day in a moderately active job, a man might burn 2000 to 2500 calories. A woman doing the same work would burn 1800 to 2300 calories.

But in a typical day of intense physical military training, the same man will burn between 3000 and 4000 calories a day. The woman will burn between 2500 and 3000 calories a day.

The more energy you burn, the more calories, or food, you need.

Many people find they need to eat more food to fuel the energy they burn in military training.

WON'T I GAIN WEIGHT IF I EAT MORE?

You won't gain weight if you eat the same amount of calories you're burning. If you eat more than you burn, you will gain weight. If you eat less than you burn, you will lose weight.

DOES EATING A PERFORMANCE DIET MEAN I HAVE TO EAT BEAN SPROUTS AND GRANOLA?

No. But some foods do help performance more than others.

In fact, the second important rule of eating for performance is to eat the right amounts — a balance — of the right kinds of foods containing the right nutrients.

Nutrients are substances that are necessary for life and growth. Some provide energy, some regulate body functions, and some build and repair body tissues.

EATING FOR PERFORMANCE ...

- ▲ Enhances your ability to train and perform at your top level .
- ▲ Increases your energy levels.
- ▲ Increases your endurance.
- ▲ Shortens your recovery time between activities.
- ▲ Increases your focus and concentration.
- ▲ Improves your ability to maintain emotional composure.
- ▲ Increases your motivation.
- ▲ Increases your confidence.
- ▲ Makes you look and feel better.

NOT EATING FOR PERFORMANCE ...

- ▲ Leads to fatigue.
- ▲ Increases risk of dehydration.
- ▲ Can cause weight problems.
- ▲ Doesn't let you reach your potential.
- ▲ May increase risk of injury.

D.W., Capt., USMC, Former Member New York Giants, Current Member, US Military Pentathlon Team

"I definitely see the results in my training. When my eating schedule gets thrown off because of travel or other extenuating circumstances, my energy level goes to zero. My workout times are the slowest when I'm not able to eat right. When I get back on my eating schedule, my speeds go back up."

There are six major classes of nutrients that are essential for our bodies — carbohydrate, protein, fat, water, vitamins and minerals. If you eat the right balance of food, you should get enough of all the nutrients you need for performance and health.

WHAT SHOULD I EAT FOR A PERFORMANCE DIET?

Nutrients work as a team. They help each other get digested, travel to the right places in your body, produce energy and repair tissue. That's why you need a balance of all nutrients for top performance and health.

Here's the balance of nutrients that sports nutritionists recommend for a performance diet.

The Six Essential Classes Of Nutrients

CARBOHYDRATE

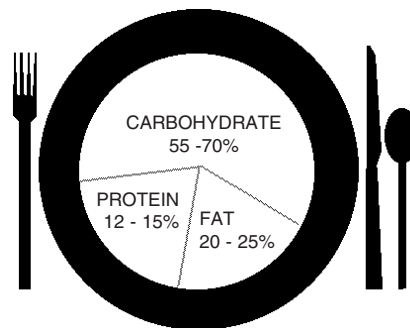
The ultra-premium energy nutrient. 55 to 70 percent of your calories should come from carbohydrates. This may be more carbohydrate than you are used to eating

PROTEIN

Builds and repairs muscles. Protein also may provide energy; however, this is not its preferred function. 12 to 15 percent of your calories should come from protein.

FAT

Gives you energy, but it's a slow burner. In a performance diet you should limit fat to 20 to 25 percent of your calories.



WATER

Perhaps the most critical performance nutrient. Keeps you hydrated.

VITAMINS

Regulate many body functions, but are not a source of energy.

MINERALS

Building blocks for body tissues. Help regulate many body functions. Not a source of energy.

The ever powerful carbohydrate — the nutrient that gives you energy for the quick start, short bursts of energy and the long haul.



Refuel Often

Carbohydrates burn fast. To keep your glycogen tanks full:

- ▲ Refuel daily.
- ▲ Eat carbohydrates at all your meals and for snacks.
- ▲ After long stretches of activity — longer than 90 minutes — eat 50 -100 grams of lowfat carbohydrate within 30 minutes. Eat additional 50-100 grams every 2-4 hours.

Sample Snack:

8 oz juice + 3 fig bars
20-25g + 33g = 53-58 grams

Sample Mini Meal:

lowfat yogurt + bagel + 8 oz juice
42g + 30-40g + 20-25g = 92-97 grams

Use these foods to make a high-carbo snack or meal.

Carbo Grams	Food	Carbo Grams	Food
34	Frozen yogurt (1 cup)	21	Corn (1/2 cup)
42	Fruit-flavored lowfat yogurt (1 cup)	12	Peas, green (1/2 cup)
44	Pinto beans (1 cup)	50	Potato (1 large)
60	Applesauce (1 cup)	30-40	Bagel (1)
27	Banana (1)	12	Bread (1 slice)
28	Grapes (1 cup)	24	Cereal, ready-to-eat (1 cup)
25	Pear (1)	22	Graham crackers (4 squares)
79	Raisins (2/3 cup)	50	Rice, cooked (1 cup)
		40	Noodles, pasta (1 cup)
		25	Pretzels (1 oz or 20 minis)

When You Don't Eat Enough Carbohydrate

- ▲ Lack of endurance: You might fall out before an activity ends.
- ▲ Harder to recover: No energy left for later in the day or for the next day.
- ▲ Slower speed: You have to slow down to make it to the end.
- ▲ Reduced concentration: Your brain gets fuzzy.
- ▲ Reduced coordination.
- ▲ Chronic fatigue.

Carbohydrate: The Energy Nutrient

CARBOHYDRATE PERFORMANCE VALUE:

- ▲ Quick start
- ▲ Endurance
- ▲ Alertness
- ▲ Short bursts of energy
- ▲ Quick recovery
- ▲ Energy that lets you do the work that builds muscle size and strength

Carbohydrate is the most important energy nutrient for heavy physical activity. Carbohydrate is your best performance fuel for a quick start, short bursts of energy and endurance over the long haul.

Foods high in carbohydrate include pasta, bread and fruit. When you digest them, they become blood sugar. Blood sugar is then converted into a substance called glycogen, which is stored in your muscles and liver as your body's premium source of energy.

Glycogen - Instant Power ... Endurance Fuel

Glycogen is ready and waiting to be used instantly. Glycogen gives you the energy to go from standing still to climbing a rope ladder or lifting a 50-pound pack.

Glycogen is your major fuel, especially in the early stages of physical activity.

Glycogen also pumps energy for those endurance activities. It's glycogen that prevents fatigue in a road march or a marathon.

Glycogen - A Quick Burn

Glycogen is a high performance fuel, but it burns quickly. And your body can't store that much of it. After 90 minutes or so of continuous exercise or during a day of intermittent strenuous physical activity, those muscle glycogen tanks are getting low. High heat and high intensity activity also increases the rate of glycogen depletion.

Complex Carbohydrates ...

also called starches — are your best source of performance carbohydrates. Complex carbohydrates are found in foods such as whole grain bread, pasta, rice, cereal and fruit.

On the other hand, training increases your body's ability to store glycogen. As you get into better shape, your muscles are able to store more glycogen, to keep you going longer. When you're fit, your muscles are also better at replacing glycogen right after exercise. That's one reason why, when you're in better shape, you don't seem as tired as you did when you began training

To store enough glycogen for fuel, you should get 55 to 70 percent of your calories from carbohydrate. It takes that much carbohydrate to make the glycogen you need for top performance in physical military training.

COMPLEX - BUT NOT DIFFICULT

Carbohydrates come in two forms - complex and simple.

And complex carbohydrates are often a great source of fiber. Fiber helps digestion. Fiber may also help prevent certain types of cancer.

Simple carbohydrates are just that — your basic sugar. Sweets such as candy and non-diet soda are simple carbohydrate foods and provide few, if any, other nutrients. Simple carbohydrates are used up quickly and cause fluctuations in your blood sugar. Simple carbohydrates should be only a small portion of your daily carbohydrate intake.



K. P., Lt., US Army Rifle Team

"How you eat, watching your nutrition, makes a difference in rifle shooting. Often our matches last 2 to 3 hours in hot and humid conditions, and if we don't eat the right kinds of food for longevity and don't continue to intake water and even sugar throughout our match, we'll find our ability to concentrate and focus mentally is really hindered."

Some Good High-Carbohydrate Foods

Pasta	Breads
Rolls	Fruit
Lentils	Crackers
Bagels	Cereals
Fruit juice	Bulgur
Tortillas	Rice
English Muffin	
Baked potatoes	
Air-popped Popcorn	

High-Protein Foods

Skim & 1% milk
Lowfat yogurt
Lowfat cottage cheese
Lean meats
Skinless poultry
Fish, not fried
Legumes: lentils, dry beans,
e.g. pinto beans



B.T., Capt., USAR

"If you don't do it, you can't describe the energy the right nutrition gives you. For one thing, you don't need as much sleep, which is definitely important for Ranger training and other high activity MOSs."

Protein

PROTEIN PERFORMANCE VALUE:

- ▲ Builds and repairs muscle and connective tissue
- ▲ Builds red blood cells
- ▲ Builds hormones and enzymes
- ▲ Backup source of energy

PROTEIN — FOR WORKING MUSCLES

Protein is essential for performance. When you are physically active, you work your muscles and connective tissues hard. You need protein to build and repair injuries to these tissues. In addition, when you run out of carbohydrate stores, your body burns protein for energy. Physically active persons need more protein than do more sedentary individuals. Surprisingly, research shows that endurance-training athletes need even more protein than do weight-training athletes.

How Much Protein?

The Recommended Dietary Allowance (RDA) for protein is 0.36 grams per pound body weight. Individuals in intense physical training may need about 1 1/2 - 2 times the RDA, up to 0.72 grams per pound, to repair tissues and build the muscle strength and size required for top performance. This does not necessarily mean you need to eat twice the amount of protein than you do when you are not in training. Most people eat this amount and more without even trying. Only 12 to 15 percent of your calories need to come from protein. The proportion of protein in the diet of most Americans is about 12 to 15 percent.

Energy In A Pinch

In a pinch, protein is also a backup energy source. But don't rely on protein for energy.

When you burn protein it's because you're low on carbohydrates. When you burn protein, you're actually burning valuable muscle tissue, which weakens muscles.

Food Has All You Need

You can get all the protein you need from food. Protein is found in foods like meat, dried beans and dairy products.

You don't need protein supplements to get enough protein for top performance. Your daily meals and snacks can easily give you the amount of protein you need, even for intense physical training.

Too much protein can hurt your training performance. It can dehydrate you and cause a loss of calcium, a mineral important for bone strength.

Fat

FAT PERFORMANCE VALUE:

- ▲ Energy in endurance activities
- ▲ Insulation from cold
- ▲ Transports fat-soluble vitamins

The Skinny On Fat

Some fat is necessary for performance. Fat supplies energy, but it takes a while to kick in.

Body fat doesn't burn easily. Fat needs more oxygen than carbohydrate to be burned for energy, so fat can't fuel high-intensity activity. And it takes time for your body to transport fat from your fat cells to your muscles. This means that fat cannot fuel quick bursts of activity. However, fat provides an important fuel source for prolonged activities. Unlike glycogen, your body can store more fat than you will ever need.

The Bad News

The bad news about fat is that too much of it can hurt your performance and health. Fat from foods stays in your stomach longer than carbohydrates do. That means that if you eat a high-fat meal before heading out to the obstacle course, the fat will sit heavy in your stomach and make you feel sluggish.

A high-fat diet contributes to obesity. Excess body fat can lower your potential to reach optimum performance and negatively affect your physical appearance. Excessive dietary fat also increases your risk of developing heart disease, stroke, and cancer — just being physically active does not make you exempt from these conditions.

Fat Filling Fat

Fat also fills you up. When you eat too much fat, you might satisfy your appetite before you get enough of those important carbohydrates.

Fat shows up in all kinds of food, from cheeseburgers and whole milk to doughnuts and tortilla chips. When you eat fat in food, it's easily converted to body fat.

Too much fat can add extra pounds, which tax your heart and lungs... which slows you down. The result? Decreased performance.

Limit Fat Intake

For top performance in military training, you should limit your fat intake to 20 to 25 percent of your daily calorie intake. This would range from 55 grams/day for a less active female to 120 grams/day for an active male. If you have trouble keeping weight on, 30 percent is okay

Don't think that because you're not overweight, the amount of fat you're eating is okay. If you eat a diet that is more than 20-25 percent fat — and most Americans do — you may not be reaching your performance potential.



Fat — slow to start, but good energy source for cruising on the longer trips. Beware! Too much fat can stall you out.

High-Fat Foods

High-fat meat
Poultry with skin
Whole milk
Whole milk yogurt
Cheese
Cream cheese
Gravies & sauces
Peanut butter
Nuts, seeds, e.g. sesame seeds & sunflower seeds
Vegetable oils
Ice cream
Salad dressing & mayonnaise



Female Marine NCO, Competitive Runner

"In basic training, I got to the point where I thought if I ate I would get sick, but I got sick from not eating. So I had to start eating more of the right things."

Water

WATER PERFORMANCE VALUE:

- ▲ Cools you down
- ▲ Helps relieve fatigue
- ▲ Keeps you mentally alert
- ▲ Carries waste products out of the body
- ▲ Transports nutrients through the body
- ▲ Maintains blood volume and pressure, which carries oxygen to tissues

Athletes Need Water

Next time you're watching a football game or tennis match, notice how often the athletes drink. Every type and class of athlete knows that water and other fluids are critical to performance.

Your body is more than half water. Water carries nutrients through your bloodstream. It helps digestion. It helps your brain function. It keeps joints, eyes and air passages moist.

When you are physically active your muscles heat up. Your body water helps cool them down. But the cooling process also takes water out of your body, in the form of sweat.

Dehydration Hurts Performance

When you don't replace body water losses, you become dehydrated. Dehydration significantly affects performance, causing a variety of symptoms from fatigue and disorientation to death.

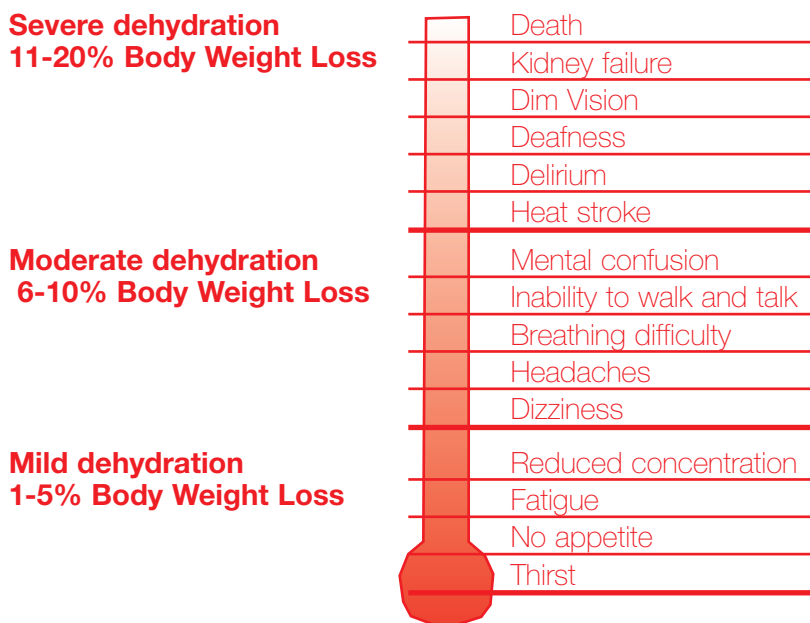
Dehydration can occur quickly. That's why you should replace water often, before, during and after physical activity. The more extreme the environment, the more water you need.

Don't wait until you feel thirsty to drink. By that time you are already dehydrated. You'll replace only three quarters of the water you've lost if you stop drinking when you are no longer thirsty.



Drink at least 8-10 cups of water a day for top performance. Coffee, tea, and colas do not count because they contain caffeine, which contributes to dehydration. Neither does alcohol which is also dehydrating.

PERFORMANCE EFFECTS OF DEHYDRATION



Vitamins & Minerals

VITAMINS

PERFORMANCE VALUE:

- ▲ Regulate energy production
- ▲ Regulate body growth, maintenance and repair

A Smooth Running Machine

First, here's what vitamins and minerals don't do. They don't give you energy. They don't make you stronger. They don't make you faster.

What vitamins and minerals do is help the other nutrients work. Vitamins and minerals help all of your body functions work smoothly.

Food Has All the Vitamins and Minerals

Eating a variety of wholesome foods should give you all of the vitamins and minerals you need for top performance. If you can't or don't want to eat a balance of foods, a multivitamin supplement with no more than 100% of the Recommended Dietary Allowances (RDA) is your best bet.

Some people could be at risk for vitamin or mineral deficiencies. Athletes training many hours a day have high needs but such little time to eat, that they may miss too many meals and rely on heavily-processed, empty-calorie foods. Some dieters eat so little that, even if they make the best food choices, they cannot get all of the nutrients they need. In addition, pregnant and lactating women, vegetarians, and frequent alcohol drinkers are often advised to take a multivitamin with mineral supplement.

MINERALS

PERFORMANCE VALUE:

- ▲ Regulate energy production
- ▲ Control water balance, muscle contraction, and nerve signal transmission
- ▲ Provide structure to bones and teeth
- ▲ Carry oxygen



Three Performance Minerals Of Special Concern

Deficiencies of any of these three minerals could have a significant effect on your training performance.

Check with a Registered Dietitian if you think you aren't getting enough of these minerals.

IRON

FUNCTION Carries oxygen to active muscles

Not Enough Iron Causes fatigue, anemia

Found in Meats (best absorbed), beans, spinach, dried fruit, and iron-enriched cereals

CALCIUM

FUNCTION Helps muscle contractions, bone strength

Not Enough Calcium Leads to stress fractures and osteoporosis

Found in Dairy products, broccoli, spinach, tofu

ZINC

FUNCTION Energy metabolism, protein synthesis, wound healing

Not Enough Zinc Slowed healing, impaired body defense system

Found in Poultry, dairy products, oysters, meats



**B.T., Capt., USAR, Coach
Military Pentathlon Team,
Former Team Member**

"The body is like a machine. If it doesn't get fuel it won't function at maximum capacity. If you want to experience peak performance, you have to look at the total approach, sort of like TQM in your unit. Part of the total system of athletic training is to improve your nutrition. "

A Note To Women In Training

Women in heavy physical activity are more prone to iron and calcium deficiencies. One reason women are more susceptible to deficiencies is that their concerns about gaining weight keep them from eating enough. Increased iron losses due to exercise and menstruation and restricted food intake increase the risk of iron deficiency.

Research shows that a common, but potentially serious, side effect of strenuous exercise and inadequate calories is the loss of menstruation, or amenorrhea. The hormonal changes associated with amenorrhea contribute to calcium loss from bones, increasing a woman's risk of stress fractures and osteoporosis. Inadequate calcium in the diet further increases the risk of bony injuries.

It's important to eat the number of calories you are burning to get the nutrients you need for performance and health. You will not gain weight if you burn what you eat.

*Nutrition ➡ The
Connection
to Performance Power*

Summary

"I used to eat a lot of junk food, fast food. I only ate two large meals a day, lunch and dinner, never breakfast. My meals were erratic. I ate a big dinner at 10 at night. I drank a lot of Coke and Pepsi.

When I was training for international competition I began to change my eating. I started by drinking a lot more water — a gallon or more. Now I drink water every time I think about it.

I broke my meals into five smaller meals a day and went to a high-carbohydrate, high-protein diet. I eliminated a lot of fat and salt. I stopped drinking soda. It's taken me about a year and a half to develop a performance eating routine, and it's still evolving."

D.W., Capt., USMC

If eating for performance means changing the way you eat, do it gradually. Your performance could suffer while your body adjusts to sudden, big changes.

Eating for performance should be something you do every day, not just the day or two before a PT test or big activity. Your daily diet is far more important in your overall performance than the food you eat right before an activity.

KEY POINTS

- ▲ When you are in intense physical military training, you work as hard as an athlete does.
- ▲ Nutrition affects all elements of performance — physical, mental and emotional.
- ▲ Basics of Performance Nutrition:
 - Eat the right amount of calories for the energy you are burning
 - Make performance eating a daily habit
 - Carbohydrate is your premium energy nutrient
 - Eat a balance of nutrients:
 - 55-70 percent carbohydrate
 - 12-15 percent protein
 - 20-25 percent fat
 - vitamins and minerals
 - Drink at least 8-10 cups of water a day
- ▲ Performance nutrition will give you optimal performance.

Performance Nutrition Glossary

This glossary contains words and phrases found throughout all six modules.

additives: Substances added to food to improve color, texture, stability, safety, or other properties.

adequate diet: A diet that provides all of the essential nutrients and calories in quantities sufficient to maintain good health and ideal body weight.

adipose tissue [ADD-uh-poce]: Fat tissue.

aerobic [a-RO-bick]: Relating to energy processes that occur in the presence of oxygen. Aerobic activities use large muscle groups in continuous exercise for long periods of time. Such activities include jogging, bicycling, and cross-country skiing.

amino acid [a-MEEN-O] A building block of protein. About 20 amino acids are found in proteins of living tissue.

amenorrhea [a-men-uh-RE-uh]: Absence or cessation of menstruation.

anaerobic [an-a-RO-bick]: Relating to energy processes that occur in the absence of oxygen.

anemia [a-NEE-me-a] Below normal levels of red blood cells and hemoglobin; there are many different types of anemias.

antioxidant [anti-OX-ih-dant]: A compound that protects other compounds from the effects of oxygen by itself reacting with oxygen.

ascorbic acid [ass-KOR-bick]: Vitamin C. Needed for maintenance of bones, teeth, and tendons; wound healing; and protection against infection. Promotes iron absorption. Found in fruits and vegetables.

balanced diet: A diet in which each nutrient is supplied in appropriate quantities relative to the others; also a diet in which the members of each food group are represented in appropriate quantities relative to the others.

beta-carotene [BAY-tuh CARE-uh-teen]: A precursor for vitamin A found in plants.

biotin [BY-o-tin]: One of the B vitamins; participates in the building of fatty acids. Widespread in many foods, especially vegetables, legumes, meats, whole grains, fruits, and milk.

blood glucose: Blood sugar; the means by which carbohydrate is carried in the blood.

body mass index: An index used as a measure of obesity; calculated by a ratio of height to weight.

caffeine [kaf-EEN]: A stimulant drug found in many food products such as coffee, tea, and cola drinks; stimulates the central nervous system and increases urination.

calcium: The most abundant mineral in the body; necessary for bone structure, nerve and muscle function, blood clotting, and normal functioning of heart muscle.

calorie: A Calorie is a measure of heat energy. The amount of heat needed to raise the temperature of one liter of water one degree centigrade.

carbohydrate [car-bo-HY-drate] A group of compounds composed of carbon, hydrogen, and oxygen arranged as a single sugar unit or multiple sugar units. Glucose, glycogen, sugar, starches, fiber, cellulose are all carbohydrates.

carbohydrate loading: A dietary method utilized by endurance-type athletes to help increase the carbohydrate (glycogen) levels in their muscles and liver. The recommended scheme utilizes a slow tapering of exercise over a six-day period, with a 70% carbohydrate diet consumed during the last three days.

carotene [CARE-uh-teen]: The vitamin A precursor abundant in yellow vegetables.

chloride [KLORE-ide]: A negatively charged electrolyte.

cholesterol [koh-LESS-ter-all]: A fat-like substance found in animal tissues, eggs, and dairy products. It can be made by the liver.

chromium [KRO-me-um]: An essential mineral involved in regulation of blood sugar levels. Food sources include peanuts, prunes, oils, various vegetables, whole-wheat bread, and chicken.

cobalt [KO-balt]: An essential nutrient; component of vitamin B12. Although no vitamin B12 is found in plant foods, cobalt by itself is found in green leafy vegetables.

complex carbohydrate: Many (ten or more) single sugar units chemically linked together; starch, glycogen, and most dietary fibers. A term used to describe a food high in starch such as bread, cereals, fruits and vegetables as contrasted to simple carbohydrates such as table sugar.

convenience food: A food prepared or packaged in such a way that it is easy to cook and serve at home.

copper: Mineral part of several enzyme systems. Found in seeds and nuts, seafood, dried fruits, legumes, and whole-grain cereals.

daily value: The reference figure or nutrient standard used on food labels. It shows how each label nutrient fits in to a 2000 calorie diet that meets the Dietary Guidelines.

dehydration [dee-high-DRAY-shun]: A reduction of the body water to below the normal level; loss of body water exceeds water intake.

dietary fiber: Fiber in plant foods that cannot be broken down by the digestive system.

diuretic [dye-you-RET-ick]: A class of agents that stimulate the formation of urine; used as a means to reduce body fluids.

electrolyte [e-LECK-tro-light]: Any substance that separates into ions when dissolved and can conduct electricity; often the ions of salts are called electrolytes, for example sodium and chloride.

empty calorie food: A popular term used to denote foods that contain few nutrients, mostly calories.

energy: The capacity to do work. {the work a system is capable of doing.}

energy nutrient: A nutrient that provides energy the body can use — carbohydrate, fat, protein. (Alcohol provides energy but is not nutrient enriched.) Refers to a process by which the nutrients thiamin, riboflavin, niacin, and iron are added back to refined grains and grain products at levels specified by law.

enzyme [EN-zime]: A protein catalyst. A catalyst is a compound that speeds up the rate of a chemical reaction without itself being altered in the process.

ergogenic aid [ur-go-JEN-ick]: Work-enhancing agents that are utilized in attempts to increase athletic or physical performance capacity.

ergogenic effect: The physiological or psychological effect that an ergogenic substance is designed to produce.

exercise intensity: The tempo, speed, or resistance of an exercise. Intensity can be increased by working faster or doing more work in a given amount of time.

fats: Organic compounds that serve as a source of energy and are used by the body to make cell membranes and regulating chemicals. Fats have a high caloric value, yielding about 9 calories per gram, compared with 4 calories per gram for carbohydrate and protein. Saturated fats have no double bonds, are generally hard at room temperature, and have been associated with increased risk of heart disease. Monounsaturated fats and polyunsaturated fats have one or more double bonds, respectively,

are generally liquid at room temperature, and have been associated with decreased risk of heart disease.

fiber [FI-ber] The indigestible residue of plants, composed of the carbohydrates cellulose, pectin, and hemicellulose and the noncarbohydrate lignin.

fluid balance: Appropriate distribution of fluid among body compartments.

folate [FOL-ate]: One of the B vitamins; also known as folic acid. Essential in preventing certain types of anemia.

food pyramid: A grouping of foods into major food groups that suggests food combinations that together supply nutrients in the amounts needed.

fortified: Refers to the addition of nutrients not normally found in a food to make the food richer than the unprocessed food, for example, vitamins A and D to milk.

fructose [FROOK-toce]: A single sugar unit sometimes known as fruit sugar; found in all sweet fruits.

glucose [GLOO-coce]: A single sugar unit sometimes known as blood sugar, sometimes as grape sugar; also called dextrose.

glucose-electrolyte replacement beverages: A drink designed to replace glycogen and sweat losses containing varying proportions of water, glucose, sodium, potassium, chloride, and other electrolytes.

glucose polymer: A combination of several glucose units into a more complex carbohydrate.

glycogen [GLIGH-co-gen]: An animal multi-sugar compound composed of glucose, manufactured in the body and stored in liver and muscle; chief storage form of carbohydrate in animals.

grapefruit pills: Health food store product with mythical claim of special fat-burning properties. Grapefruit pills contain grapefruit extract, diuretics, and bulk-forming agents. Some contain

phenylpropanolamine, a nasal decongestant that is also a mild appetite suppressant, along with herbs or other ingredients.

health: The state of complete physical, mental, and social well-being.

hemoglobin [HEEM-o-globe-in]: The oxygen-carrying protein of the blood; found in the red blood cells.

hidden fat: Fat in foods that is not readily apparent, such as the high-fat content of cheese.

hormone: A chemical messenger. Hormones are secreted by a variety of glands in the body. Each affects a specific tissue or organ and elicits a specific response.

human growth hormone (hGH): A hormone released by the pituitary gland that regulates growth; also involved in fat metabolism.

hydrogenation [HI-druh-jun-A-shun]: A process that breaks the double bond in an unsaturated fat in order to add hydrogen atoms. This creates a saturated fat and puts some of the double bonds in a 'trans' arrangement. Trans fatty acids are easily oxidized and are implicated in cardiovascular disease.

insulin [IN-suh-lin]: A hormone secreted by the pancreas that promotes use of glucose and lowers blood sugar.

iron: One of the major minerals and an important component of hemoglobin, myoglobin (a muscle protein molecule that binds oxygen), and a number of enzyme systems. Lean meats, fish, and seafood are good sources. Many plant foods such as molasses, fortified breakfast cereals, seeds and nuts, dried fruits, and legumes are also high in iron.

kilogram (kg): A unit of mass in the metric system; 1 kilogram is equivalent to 2.2 pounds.

lactic acid [LACK-tick ASS-id]: Produced during muscle contraction when oxygen is lacking. One of the causes of fatigue.

lactose: [LACK-toce]: A double sugar unit composed of glucose and galactose; commonly known as milk sugar.

lactose intolerance: Intestinal disturbance due to intolerance to lactose in milk; caused by deficiency of lactase, an enzyme that digests lactose. Common among American Indians, American Blacks, Asians and Orientals, and Mexican Americans.

lean body mass: The body weight minus the body fat, composed primarily of muscle, bone, and other nonfat tissues.

legume [leg-GYOOM, LEG-yoom]: A plant of the bean and pea family having roots with nodules that contain bacteria that can fix atmospheric nitrogen. The seeds are rich in high-quality protein as compared with that of most other plant foods; includes soybeans, kidney beans, lima beans, garden peas, black-eyed peas, and lentils.

leucine [LOO-seen]: An essential amino acid; a branched-chain amino acid.

maltose [MALL-toce]: A double sugar unit composed of two glucose units; sometimes known as malt sugar.

lysine [LYE-seen]: An essential amino acid.

magnesium [mag-NEE-zee-um]: One of the major minerals of the human body, required for more than 300 different enzyme systems. The use and storage of carbohydrate, fat, and protein in the body involves many reactions that are magnesium-dependent. It is also essential in nerve and muscle activity. Magnesium-rich foods include seeds and nuts, whole-grain cereals, dark green vegetables, legumes, and dried fruits.

major minerals: Those minerals needed in amounts greater than 100 milligrams per day: calcium, magnesium, phosphorus, sodium, potassium, and chloride.

manganese [MANG-uh-nee-z]: Mineral that is part of a number of enzyme systems. Important for reproduction, bone development, and proper functioning of the

brain and spinal cord. Nuts and seeds, whole grains, and various fruits and vegetables are good sources. Very little is present in animal products.

megadose: Extremely high intake of vitamins or minerals that may lead to health problems and toxicity. At high doses, nutrients act as drugs rather than nutrients.

metabolism [meh-TAB-o-lizm]: The sum total of all the chemical reactions that go on in living cells.

MRDA: Military Recommended Dietary Allowances; the levels of intake of essential nutrients considered to be adequate to meet the known nutritional needs of practically all healthy military persons.

microgram (mcg or μ g): One millionth of a gram.

milligram (mg): One thousandth of a gram

mineral: A naturally occurring, inorganic, homogeneous substance; an element.

natural food: An unprocessed food.

niacin [NIGH-uh-sin]: One of the B vitamins important in several enzyme systems involved in processes in cells that release energy from carbohydrate, protein, and fat. Essential for growth, energy production, and hormone synthesis. Active forms include nicotinic acid, nicotinamide, or niacinamide.

nutrient: A substance obtained from food that provides energy, promotes growth and repair of tissues, or regulates metabolism.

nutrient density: A characteristic of a food, meaning that it provides a high quantity (relative to need) of one or more essential nutrients, with a small quantity (relative to need) of calories.

nutritional labeling: A listing of selected key nutrients and calories on the label of commercially prepared food products.

Olestra: A synthetic fat that is made from sucrose and fatty acids. It is not digestible.

pangamic acid [pan-GAM-ick ASS-id]: Not a vitamin but marketed as one. Called "vitamin B15." Usual composition is calcium gluconate and dimethylglycine.

pantothenic acid [PAN-tuh-then-ick]: A B vitamin; part of an enzyme essential to fat, carbohydrate, and protein metabolism. Found in legumes, nuts, many vegetables, poultry, dried fruits, whole grains, yogurt, and many fresh fruits.

peptide [PEP-tide]: A protein fragment a few amino acids long; known as dipeptide, tripeptide, etc. depending upon the number of amino acids combined.

Performance Food Pyramid: A food guide system for individuals expending high levels of energy in athletic or physical military training.

performance nutrition: The application of nutritional principles for physical and mental work with the intent of maximizing military performance.

phosphorus [FOS-fur-us]: An essential nonmetallic element; teams up with calcium in forming bones and teeth. Involved in the metabolism of carbohydrates, proteins, and fats. Found in many dairy products, cereals, and meats.

physical activity: Any form of muscular movement.

placebo [pla-SEE-bo]: An inert, harmless medication given to provide comfort and hope.

placebo effect: The healing effect that faith in medicine, even useless medicine, often has.

potassium [Puh-TASS-ee-um]: An essential metallic element. It is the principal positive ion inside body cells. Found widely in fruits and vegetables and nuts.

proof: Relative to alcohol content, proof is twice the percentage of alcohol in a solution: 80-proof whiskey is 40% alcohol.

protein [PRO-teen]: Any one of a group of complex organic compounds formed from amino acids linked in a chain, usually about 300 units long. The amino acids are essential for growth and repair of living tissues.

protein-sparing action: The action of carbohydrate and fat which, by providing energy, allows protein to be used for other purposes.

quackery: Misrepresentation of the facts to deceive the consumer.

RE (retinol equivalents): A measure of vitamin A activity.

refined: Refers to the products in which the coarse parts of the food products have been removed. For example, the refining of wheat into flour involves removing three of the four parts of the kernel — the chaff, the bran, and the germ — leaving only the endosperm (the starch).

retinol [RET-in-all]: Active preformed vitamin A.

riboflavin [RYE-bo-flay-vin]: Vitamin B2; component of two vital enzyme systems that help release energy from food. The most abundant sources are milk and milk products.

salt: A compound composed of a positive and a negative ion. For example, sodium chloride (Na^+Cl^-) is table salt.

saturated fatty acids: Fats that have all chemical bonds filled.

selenium: An essential nonmetallic element resembling sulfur.

simple carbohydrates: The sugars glucose, fructose, galactose, maltose, lactose and sucrose.

Simpless: An artificial fat made from protein.

sodium [SO-dee-um]: An essential metallic element; the major positive ion in the body. Sodium chloride or table salt is 40% sodium and 60% chloride.

sports anemia: A temporary condition of low hemoglobin levels often observed in athletes during the early stages of training.

sports nutrition: The application of nutritional principles to sport with the intent of maximizing performance.

starch: A storage form of sugar in plants composed of many glucose units in branching chains.

starch blockers: Enzyme inhibitors that are supposed to block the digestion and absorption of dietary carbohydrate. They don't work and may be risky.

sucrose [SOO-crose]: A double-sugar unit composed of glucose and fructose, commonly known as table sugar, beet sugar, or cane sugar.

supplement: Substance or pill that is added to the regular diet. Unwarranted for most people eating a balanced diet.

thiamin [THIGH-uh-min]: Vitamin B1; needed to release energy from carbohydrates and for nerve and heart function. Best sources include seeds and nuts, lean pork, whole and enriched grains, legumes, wheat germ and fish.

toxicity: The ability of a substance to be poisonous or cause harmful effects. All substances are toxic if high enough concentrations are used.

trace element/mineral: An essential mineral nutrient found in the human body, making up less than 0.005 percent of the body weight and needed in amounts less than 100 milligrams per day.

tryptophan [TRIP-toe-fan]: An amino acid essential for human beings, convertible to niacin in the body.

tyrosine [TIE-ruh-seen]: A nonessential amino acid.

valine [VA-leen or VAL-een]: An essential amino acid.

whole grain: Refers to a grain that retains its edible outside layers (has not been refined).

vitamin [VITE-uh-min]: One of a group of nutrients essential for life. The body uses these organic substances to accomplish much of its work. Vitamins do not supply energy, but they do help release energy from carbohydrates, fats, and proteins. They also play a vital role in chemical reactions throughout the body.

vitamin B6: One of the B vitamins; required for protein metabolism. Active forms include pyridoxal, pyridoxine, and pyridoxamine. Good sources are legumes, dried fruit, seeds and nuts, bananas, rice, and many vegetables.

vitamin B12: One of the B vitamins, also known as cobalamin. Found only in foods of animal origin.

vitamin C: See ascorbic acid.

vitamin D: Needed for bone growth and regulation of blood calcium and phosphorus levels. Best source is vitamin D fortified dairy products.

vitamin deficiency: Below-normal body-vitamin levels due to inadequate intake or absorption; specific disorders occur dependent upon the deficient vitamin.

vitamin E: An antioxidant vitamin; protects cell membranes. Best source is vegetable oils. Margarine, whole grains, dark-green leafy vegetables, nuts, seeds, and legumes are also sources.

water: A tasteless, colorless odorless fluid essential for life.

work: Effort expended to accomplish something; in terms of physics, force times distance.

zinc [zink]: An essential, metallic element, part of more than 70 major enzyme systems which control growth, sexual maturation, wound healing, and the maintenance of skin, hair, nails, and mucous membranes of the mouth, throat, stomach, and intestines. Good sources are seeds and nuts, legumes, whole-grain cereals, dairy products, and lean meats.